



- ☐ Tentative Specification
- ☒ Preliminary Specification
- ☐ Approval Specification

MODEL NO.: V236H1
SUFFIX: LE1

Customer:

APPROVED BY

SIGNATURE

Name / Title

Note

Please return 1 copy for your confirmation with your signature and comments.

Approved By	Checked By	Prepared By
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PRODUCT SPECIFICATION

REVISION HISTORY

Version	Date	Page(New)	Section	Description
Ver. 1.0	18,Jun, 10	All	All	The preliminary specification was first issued.

1. GENERAL DESCRIPTION

1.1 OVERVIEW

V236H1-LE1 is a 23.6" TFT Liquid Crystal Display module with WLED Backlight unit and 30 pins 2ch-LVDS interface. This module supports 1920 x 1080 Full HD mode and can display up to 16.7M colors. The converter module for Backlight is not built in.

1.2 FEATURES

- Extra-wide viewing angle.
- High contrast ratio.
- Fast response time.
- High color saturation.
- Full HD (1920 x 1080 pixels) resolution.
- DE (Data Enable) only mode.
- LVDS (Low Voltage Differential Signaling) interface.
- RoHS compliance.

1.3 APPLICATION

- Standard Living Room TVs
- MFM Application

1.4 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	521.28(H) x 293.22(V) (23.547" real diagonal)	mm	(1)
Bezel Opening Area	525.22 (H) x 297.22 (V)	mm	
Driver Element	a-si TFT active matrix	-	-
Pixel Number	1920 x R.G.B. x 1080	pixel	-
Pixel Pitch(Sub Pixel)	0.2715 (H) x 0.0905 (V)	mm	-
Pixel Arrangement	RGB vertical stripe	-	-
Display Colors	16.7M	color	-
Display Operation Mode	Normally White	-	-
Surface Treatment	Anti-Glare coating (Haze 25%)	-	(2)

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) Please refer to sec.3.1 & 3.2 for more information of power consumption

**1.5 MECHANICAL SPECIFICATIONS**

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal(H)	544.3	544.8	545.3	mm	(1)
	Vertical(V)	320.0	320.5	321.0	mm	
	Depth(D)	10.9	11.4	11.9	mm	
Weight		-	2450	2500	g	-

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) Please refer to sec.3.1 & 3.2 for more information of power consumption

2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-20	60	°C	(1)
Operating Ambient Temperature	T _{OP}	0	50	°C	(1), (2)
Shock (Non-Operating)	S _{NOP}	-	50	G	(3), (5)
Vibration (Non-Operating)	V _{NOP}	-	1.5	G	(4), (5)

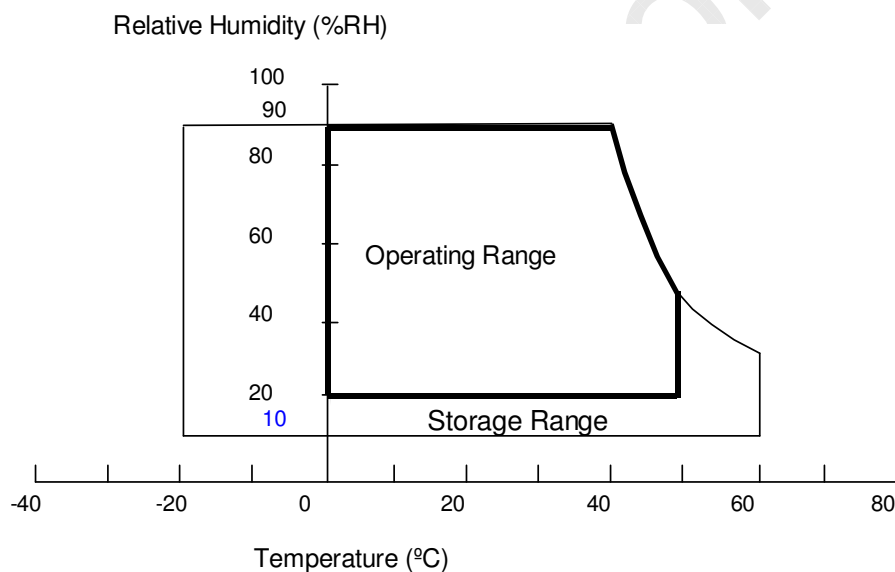
Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. ($T_a \leq 40$ °C).

(b) Wet-bulb temperature should be 39 °C Max. ($T_a > 40$ °C).

(c) No condensation.

Note (2) The temperature of panel display surface area should be 0 °C Min. and 60 °C Max

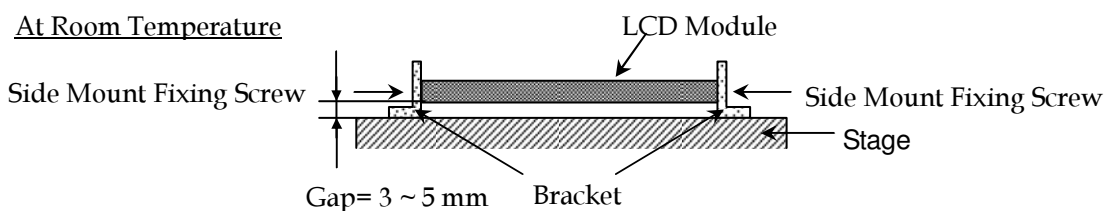


Note (3) 11ms, half sine wave, 1 time for $\pm X$, $\pm Y$, $\pm Z$.

Note (4) 10 ~ 300 Hz, 10min/cycle, 3 cycles each X, Y, Z.

Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

The fixing condition is shown as below:



2.2 PACKAGE STORAGE

When storing modules as spares for a long time, the following precaution is necessary.

Do not leave the module in high temperature, and high humidity for a long time, It is highly recommended to store the module with temperature from 0 to 35 °C at normal humidity without condensation.

The module shall be stored in dark place. Do not store the TFT-LCD module in direct sunlight or fluorescent light.

2.3 ELECTRICAL ABSOLUTE RATINGS

2.3.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	Vcc	-0.3	+6.0	V	(1)
Logic Input voltage	Vlogic	-0.3	3.6		

2.3.2 BACKLIGHT UNIT

Item	Symbol	Value			Unit	Note
		Min.	Typ	Max.		
LED Forward Current Per Input Pin	I _F	---	60	75	mA	(1), (2) Duty=100%
LED Reverse Voltage Per Input Pin	V _R	---	---	60	V	
LED Pulse Forward Current Per Input Pin	I _P	---	---	240	mA	(1), (2) Pulse Width ≤ 10msec. and Duty ≤ 10%

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions.

Note (2) Specified values are for input pin of LED light bar at Ta=25±2 °C (Refer to 3.2 for further information).

3. ELECTRICAL CHARACTERISTICS

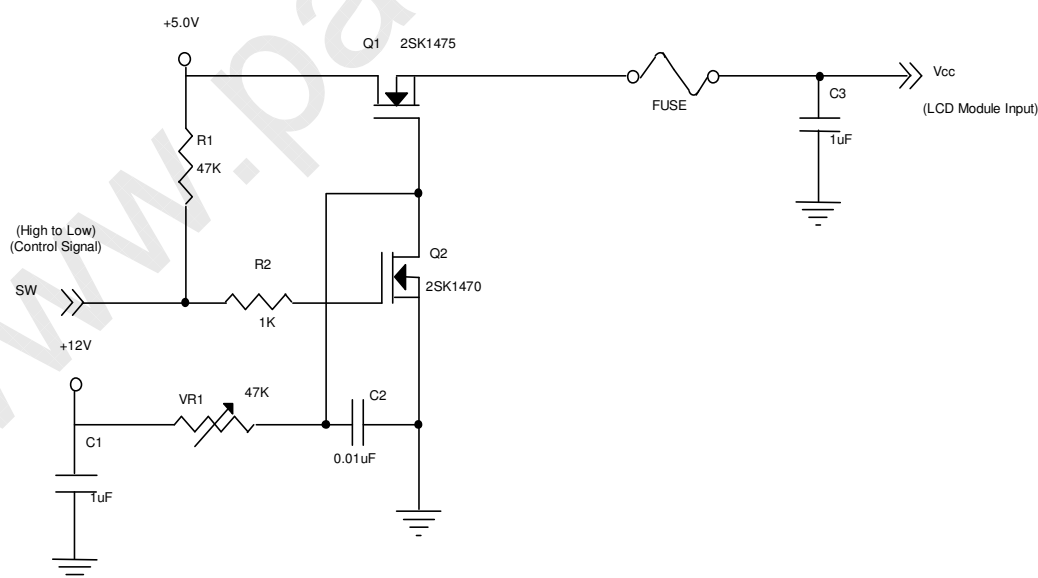
3.1 TFT LCD MODULE

Ta = 25 ± 2 °C

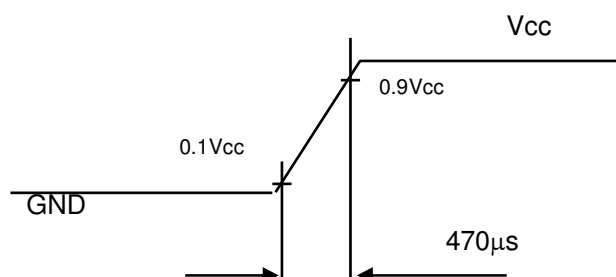
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V _{CC}	4.5	5.0	5.5	V	-
Ripple Voltage		V _{RP}	-	-	100	mV	-
Rush Current		I _{RUSH}			3	A	(2)
Power Supply Current	White		0.5	0.6	0.72	A	(3)a
	Black		1.1	1.32	1.08	A	(3)b
	Vertical Stripe		0.9	1.08	1.02	A	(3)c
Power Consumption		PLCD		5.5	6.6	Watt	(4)
LVDS differential input voltage		V _{id}	200	-	600	mV	(5)
LVDS common input voltage		V _{ic}	1.0	1.2	1.4	V	(5)
Logic High Input Voltage		V _{IH}	2.64	-	3.6		
Logic Low Input Voltage		V _{IL}	0	-	0.66		

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions:



Vcc rising time is 470 μ s



Note (3) The specified power supply current is under the conditions at $V_{CC} = 5.0\text{ V}$, $T_a = 25 \pm 2\text{ }^{\circ}\text{C}$, $F_r = 60\text{ Hz}$, whereas a power dissipation check pattern below is displayed.

a. White Pattern



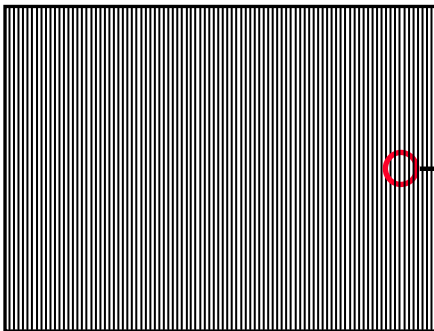
Active Area

b. Black Pattern

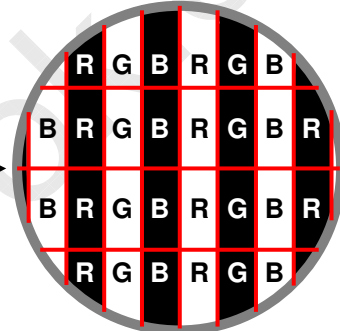


Active Area

c. Vertical Stripe Pattern



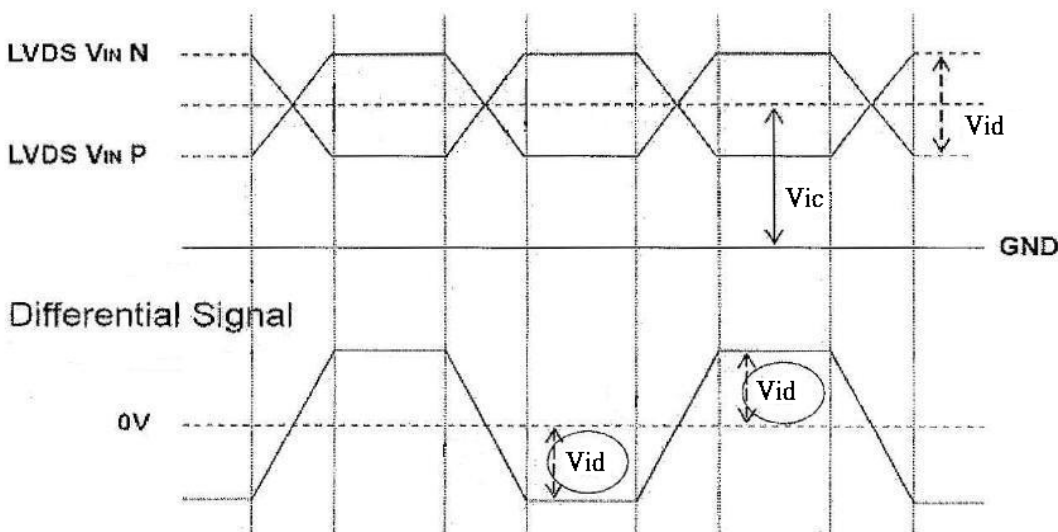
Active Area

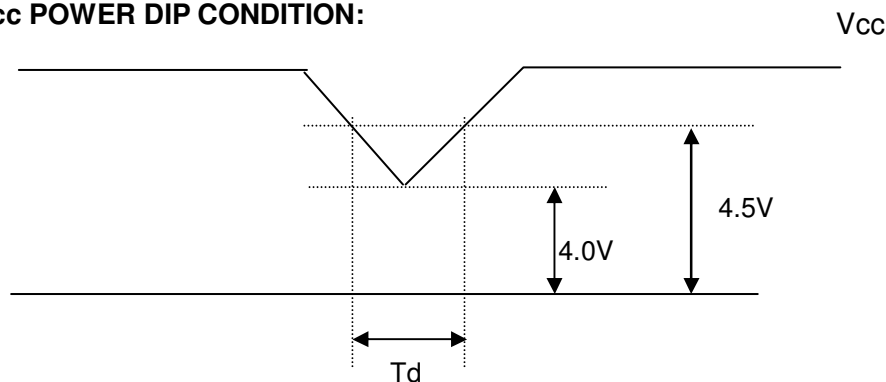


Note (4) The power consumption is specified at the pattern with the maximum current

Note (5) VID waveform condition

Single-End



3.2 Vcc POWER DIP CONDITION:

Dip condition: $4.0V \leq V_{cc} \leq 4.5V, T_d \leq 20ms$

3.3 BACKLIGHT UNIT

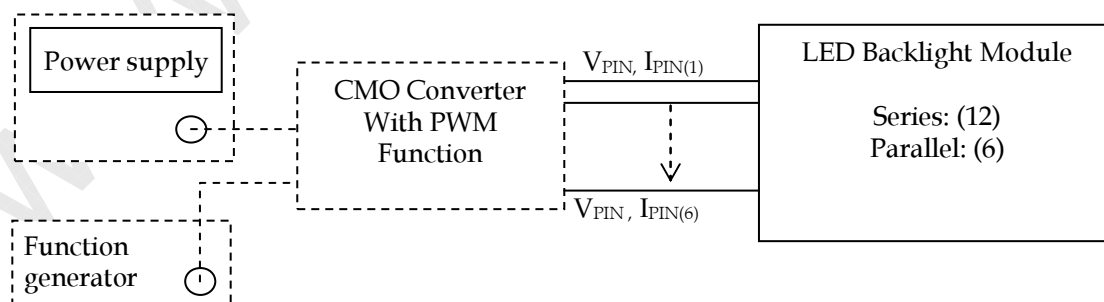
Ta = 25 ± 2 °C

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Light Bar Input Voltage	V _{LED}	34	38.4	42	V	(1), Duty=100%, I _{PIN} =40mA
Light Bar Input Current	I _{LED}	0	60	75	mA	(1), (2) Duty=100%
Power Consumption	P _{LED}	---	13.8	15.2	W	(1) Duty=100%, I _{PIN} =40mA
LED Life Time	L _{BL}	15000	30000	Hr		(3)

Note (1) LED light bar input voltage and current are measured by utilizing a true RMS multimeter as shown below:

Note (2) PBL = I_{PIN} × V_{PIN} × (6) input pins , LED light bar circuit is (12)Series, (6)Parallel.

Note (3) The lifetime of LED is defined as the time when LED packages continue to operate under the conditions at Ta = 25 ± 2 °C and I = (20)mA (per chip) until the brightness becomes ≤ 50% of its original value.

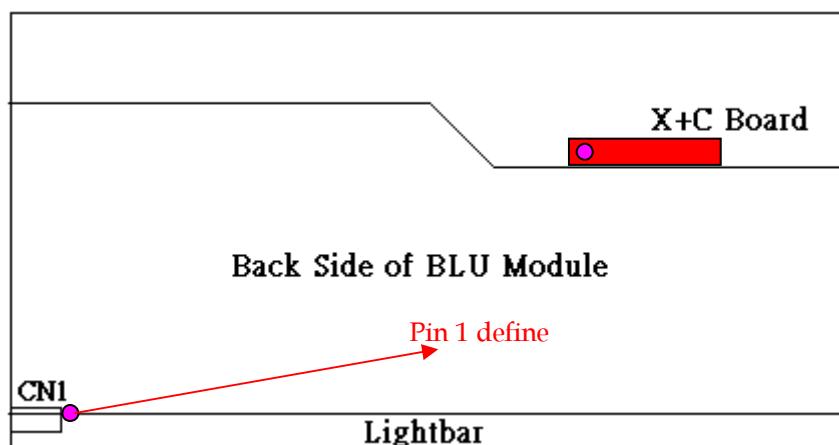


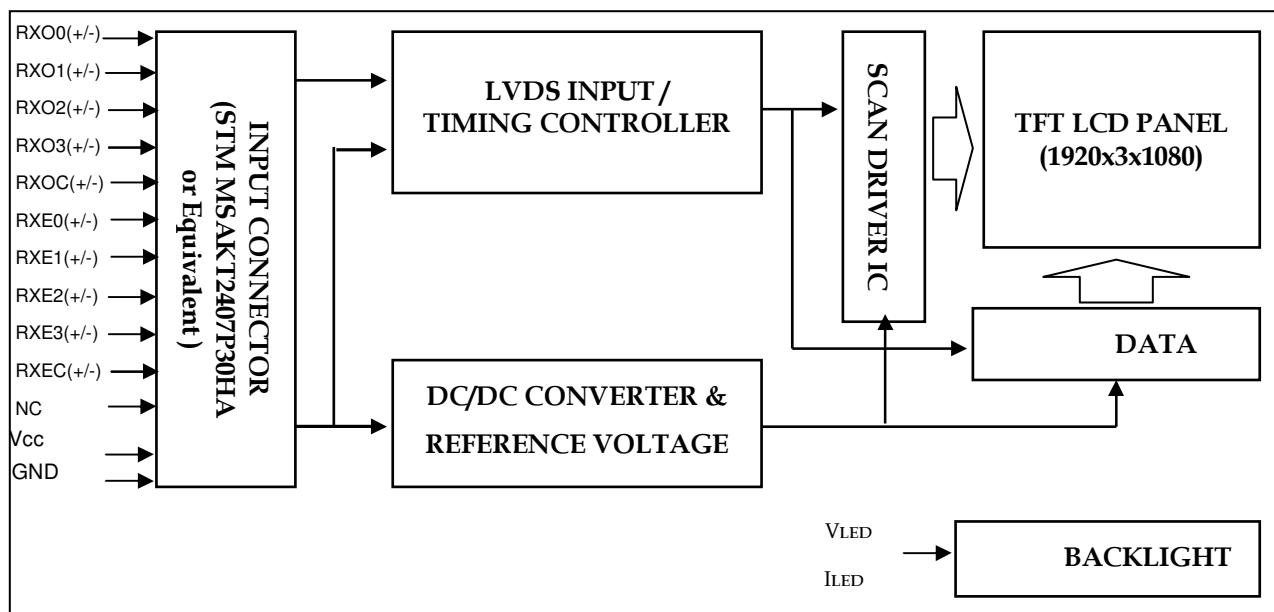
3.4 LIGHTBAR Connector Pin Assignment

Connector: 7083K-F12N-00L , (Entery) or Compatible

CN1

Pin number	Description
1	Not connection, this pin should be open
2	Cathode of LED string
3	Cathode of LED string
4	Cathode of LED string
5	Not connection, this pin should be open
6	VLED
7	VLED
8	Not connection, this pin should be open
9	Cathode of LED string
10	Cathode of LED string
11	Cathode of LED string
12	Not connection, this pin should be open



4. BLOCK DIAGRAM**4.1 TFT LCD MODULE**

5. INPUT TERMINAL PIN ASSIGNMENT

5.1 TFT LCD MODULE

Pin	Name	Description
1	RXO0-	Negative LVDS differential data input. Channel O0 (odd)
2	RXO0+	Positive LVDS differential data input. Channel O0 (odd)
3	RXO1-	Negative LVDS differential data input. Channel O1 (odd)
4	RXO1+	Positive LVDS differential data input. Channel O1 (odd)
5	RXO2-	Negative LVDS differential data input. Channel O2 (odd)
6	RXO2+	Positive LVDS differential data input. Channel O2 (odd)
7	GND	Ground
8	RXOC-	Negative LVDS differential clock input. (odd)
9	RXOC+	Positive LVDS differential clock input. (odd)
10	RXO3-	Negative LVDS differential data input. Channel O3(odd)
11	RXO3+	Positive LVDS differential data input. Channel O3 (odd)
12	RXE0-	Negative LVDS differential data input. Channel E0 (even)
13	RXE0+	Positive LVDS differential data input. Channel E0 (even)
14	GND	Ground
15	RXE1-	Negative LVDS differential data input. Channel E1 (even)
16	RXE1+	Positive LVDS differential data input. Channel E1 (even)
17	GND	Ground
18	RXE2-	Negative LVDS differential data input. Channel E2 (even)
19	RXE2+	Positive LVDS differential data input. Channel E2 (even)
20	RXEC-	Negative LVDS differential clock input. (even)
21	RXEC+	Positive LVDS differential clock input. (even)
22	RXE3-	Negative LVDS differential data input. Channel E3 (even)
23	RXE3+	Positive LVDS differential data input. Channel E3 (even)
24	GND	Ground
25	NC	For LCD internal use only, Do not connect
26	NC	For LCD internal use only, Do not connect
27	NC	For LCD internal use only, Do not connect
28	Vcc	+5.0V power supply
29	Vcc	+5.0V power supply
30	Vcc	+5.0V power supply

Note (1) Connector Part No.: STM, MSCKT2407P30HA or Equivalent

Note (2) Mating Wire Cable Connector Part No.: FI-X30H(JAE) or FI-X30HL(JAE).

Note (3) Mating FFC Cable Connector Part No.: 217007-013001 (P-TWO) or JF05X030-1 (JAE).

Note (4) The first pixel is odd.

Note (5) Input signal of even and odd clock should be the same timing.

**5.2 LVDS DATA MAPPING TABLE**

LVDS Channel O0	LVDS output	D7	D6	D4	D3	D2	D1	D0
	Data order	OG0	OR5	OR4	OR3	OR2	OR1	OR0
LVDS Channel O1	LVDS output	D18	D15	D14	D13	D12	D9	D8
	Data order	OB1	OB0	OG5	OG4	OG3	OG2	OG1
LVDS Channel O2	LVDS output	D26	D25	D24	D22	D21	D20	D19
	Data order	DE	NA	NA	OB5	OB4	OB3	OB2
LVDS Channel O3	LVDS output	D23	D17	D16	D11	D10	D5	D27
	Data order	NA	OB7	OB6	OG7	OG6	OR7	OR6
LVDS Channel E0	LVDS output	D7	D6	D4	D3	D2	D1	D0
	Data order	EG0	ER5	ER4	ER3	ER2	ER1	ER0
LVDS Channel E1	LVDS output	D18	D15	D14	D13	D12	D9	D8
	Data order	EB1	EB0	EG5	EG4	EG3	EG2	EG1
LVDS Channel E2	LVDS output	D26	D25	D24	D22	D21	D20	D19
	Data order	DE	NA	NA	EB5	EB4	EB3	EB2
LVDS Channel E3	LVDS output	D23	D17	D16	D11	D10	D5	D27
	Data order	NA	EB7	EB6	EG7	EG6	ER7	ER6



5.3 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Green(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note (1) 0: Low Level Voltage, 1: High Level Voltage

6. INTERFACE TIMING

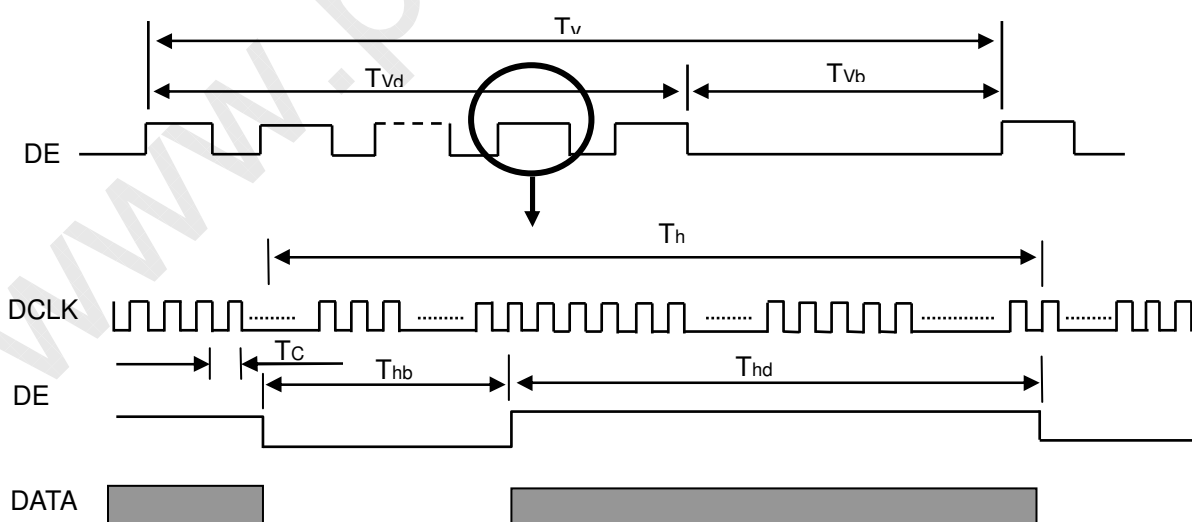
6.1 INPUT SIGNAL TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

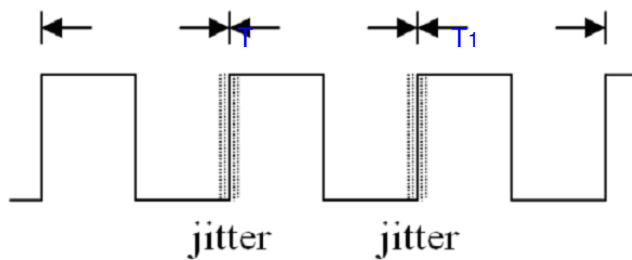
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	F _c	58.54	74.25	98	MHz	-
	Period	T _c	-	13.47	-	ns	
	Input cycle to cycle jitter	T _{rcl}	-0.02*T _c	-	0.02*T _c	ns	(1)
	Spread spectrum modulation range	F _{clk_in_mod}	0.98*F _c	-	1.02*F _c	MHz	(2)
	Spread spectrum modulation frequency	F _{SSM}	-	-	200	KHz	
	High Time	T _{ch}	-	4/7	-	T _c	-
	Low Time	T _{cl}	-	3/7	-	T _c	-
LVDS Data	Setup Time	T _{lvs}	600	-	-	ps	(3)
	Hold Time	T _{lvh}	600	-	-	ps	
Vertical Active Display Term	Frame Rate	Fr	50	60	75	Hz	T _v =T _{vd} +T _{vb}
	Total	T _v	1115	1125	1136	Th	-
	Display	T _{vd}	1080	1080	1080	Th	-
	Blank	T _{vb}	35	45	56	Th	-
Horizontal Active Display Term	Total	T _h	1050	1100	1150	T _c	T _h =T _{hd} +T _{hb}
	Display	T _{hd}	960	960	960	T _c	-
	Blank	T _{hb}	90	140	190	T _c	-

Note: Because this module is operated by DE only mode, Hsync and Vsync input signals are ignored.

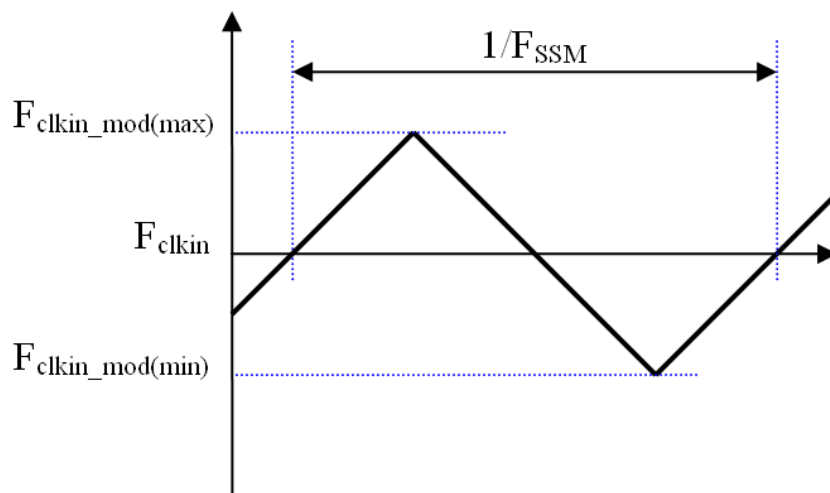
INPUT SIGNAL TIMING DIAGRAM



Note (1) The input clock cycle-to-cycle jitter is defined as below figures. $T_{rcl} = |T_1 - T_1|$

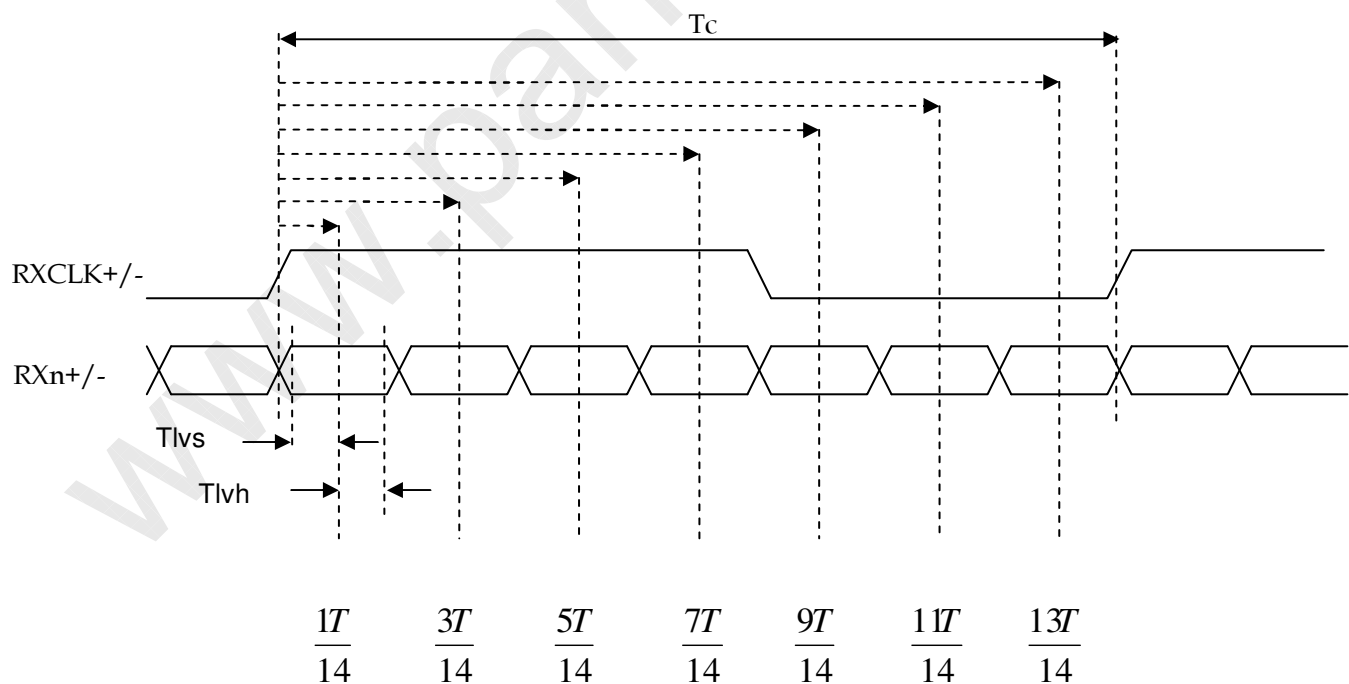


Note (2) The SSCG (Spread spectrum clock generator) is defined as below figures.



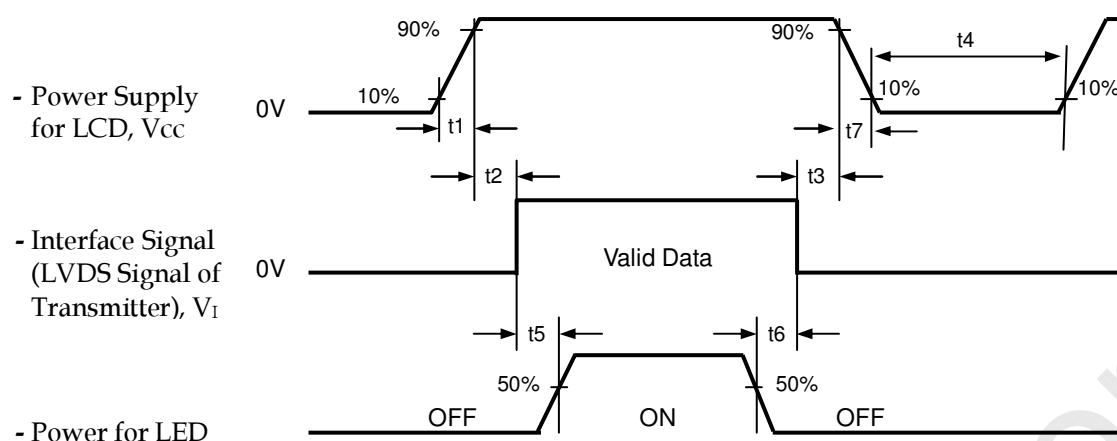
Note (3) The LVDS timing diagram and setup/hold time is defined and showing as the following figures.

LVDS RECEIVER INTERFACE TIMING DIAGRAM



6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



Timing Specifications:

$$0.5 < t1 \leq 10 \text{ msec}$$

$$0 < t2 \leq 50 \text{ msec}$$

$$0 < t3 \leq 50 \text{ msec}$$

$$t4 \geq 500 \text{ msec}$$

$$t5 \geq 450 \text{ msec}$$

$$t6 \geq 90 \text{ msec}$$

$$5 < t7 \leq 100 \text{ msec}$$

Note.

- (1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.
 - (2) Apply the LED voltage within the LCD operation range. When the backlight turns on before the LCD operation of the LCD turns off, the display may momentarily become abnormal screen.
 - (3) In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.
 - (4) T4 should be measured after the module has been fully discharged between power off and on period.
 - (5) Interface signal shall not be kept at high impedance when the power is on.
 - (6) It is not guaranteed that products are damaged which is caused by not following the Power Sequence.
- It is suggested that Vcc falling time follows t7 specification, else slight noise is likely to occur when LCD is turned off (even backlight is already off).

7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

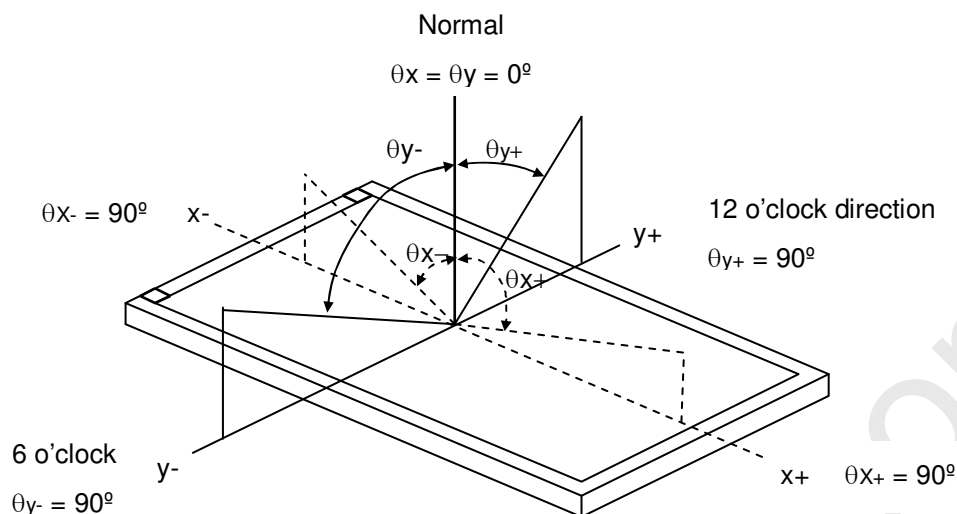
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V _{CC}	TBD	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
LED Light Bar Input Current Per Input Pin	I _{PIN}	60 ± 1.8	mA _{DC}
PWM Duty Ratio	D	100	%
LED Light Bar Test Converter	TBD		

7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (5).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Chromaticity (CIE 1931)	Red	R _x	$\theta_x=0^\circ, \theta_Y=0^\circ$ CS-2000	Typ – 0.03	(0.641)	Typ + 0.03	-	(1), (5)
		R _y			(0.338)			
	Green	G _x			(0.306)			
		G _y			(0.605)			
	Blue	B _x			(0.151)			
		B _y			(0.061)			
	White	W _x			(0.285)			
		W _y			(0.293)			
	Center Luminance of White (Center of Screen)				L _C			
Contrast Ratio		CR	700	1000	-	-	(2), (5)	
Response Time		T _R	$\theta_x=0^\circ, \theta_Y=0^\circ$	-	1.5	2.5	ms	(3)
		T _F		-	3.5	5.5		
White Variation		δW	$\theta_x=0^\circ, \theta_Y=0^\circ$ USB2000	-	-	1.33	-	(5), (6)
Viewing Angle	Horizontal	x- + x+	CR ≥ 10 USB2000	150	170	-	Deg.	(1), (5)
	Vertical	y- + y+		140	160	-		
Viewing Angle	Horizontal	x- + x+	CR ≥ 5 USB2000	160	178	---	Deg.	(1), (5)
	Vertical	y- + y+		150	170	---		

Note (1) Definition of Viewing Angle (θ_x , θ_y):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

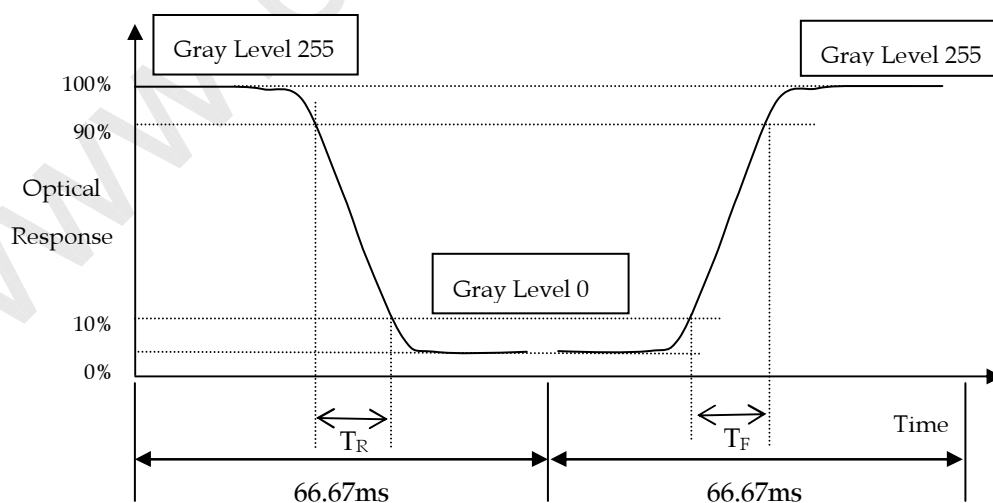
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R , T_F):



Note (4) Definition of Luminance of White (LC):

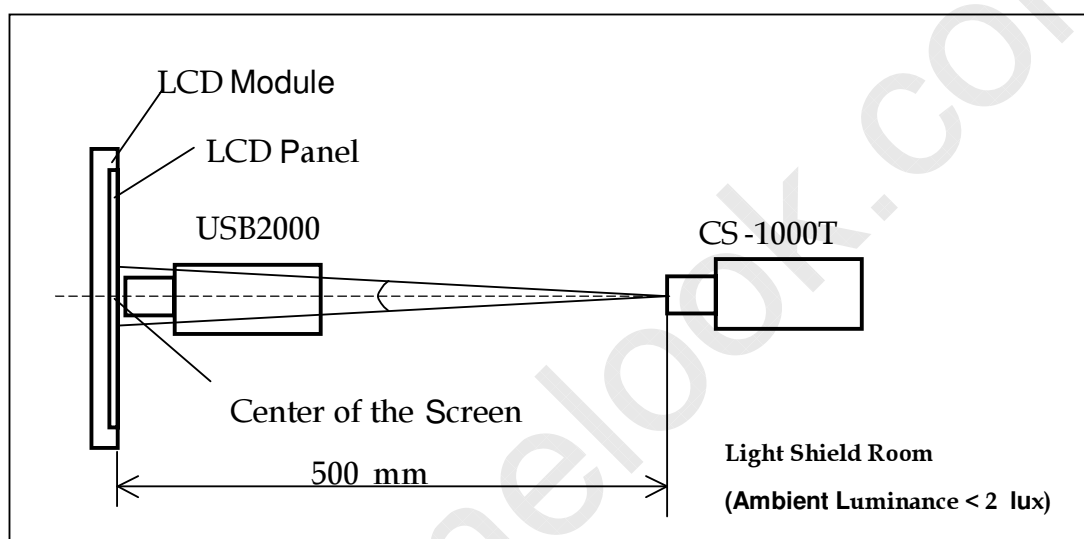
Measure the luminance of gray level 255 at center point

$LC = L(5)$

$L(x)$ is corresponding to the luminance of the point X at Figure in Note (6).

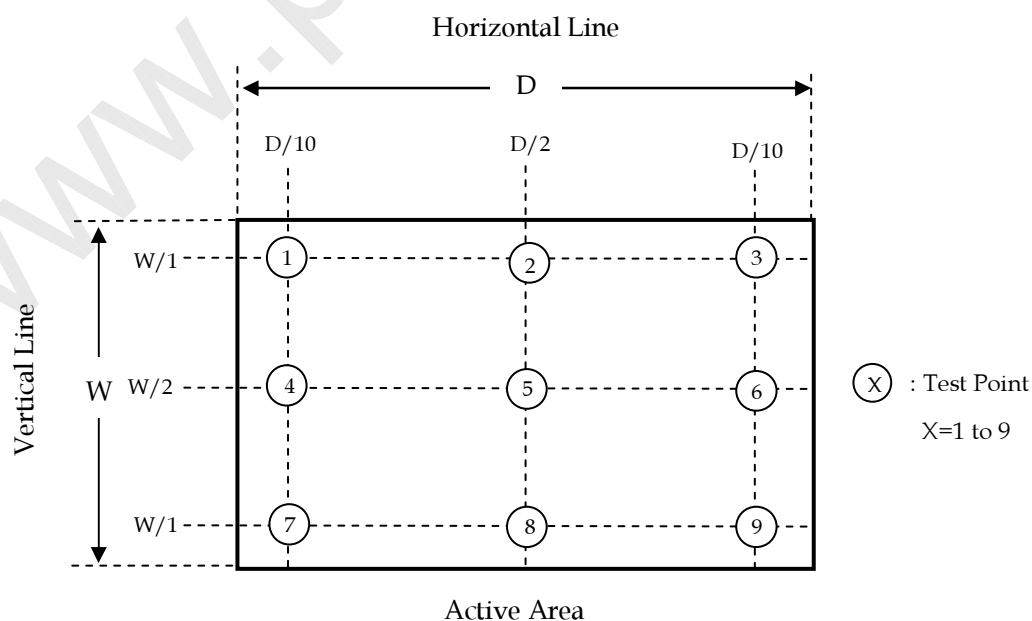
Note (5) Measurement Setup:

The LCD module should be stabilized at given temperature for 40 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 40 minutes in a windless room.



Note (6) Definition of White Variation (δW): Measure the luminance of gray level 255 at 9 points

$\delta W = \text{Maximum } [L(1) \sim L(9)] / \text{Minimum } [L(1) \sim L(9)]$



8. PRECAUTIONS

8.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) To assemble or install module into user's system can be only in clean working areas. The dust and oil may cause electrical short or worsen the polarizer.
- (3) It's not permitted to have pressure or impulse on the module because the LCD panel and Backlight will be damaged.
- (4) Always follow the correct power sequence when LCD module is connecting and operating. This can prevent damage to the CMOS LSI chips during latch-up.
- (5) Do not pull the I/F connector in or out while the module is operating.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) It is dangerous that moisture come into or contacted the LCD module, because moisture may damage LCD module when it is operating.
- (9) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (10) When ambient temperature is lower than 10°C may reduce the display quality. For example, the response time will become slowly, and the starting voltage of CCFL will be higher than room temperature.

8.2 SAFETY PRECAUTIONS

- (1) The startup voltage of Backlight is approximately 1000 Volts. It may cause electrical shock while assembling with converter. Do not disassemble the module or insert anything into the Backlight unit.
 - (2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- After the module's end of life, it is not harmful in case of normal operation and storage.

8.3 SAFETY STANDARDS

The LCD module should be certified with safety regulations as follows:

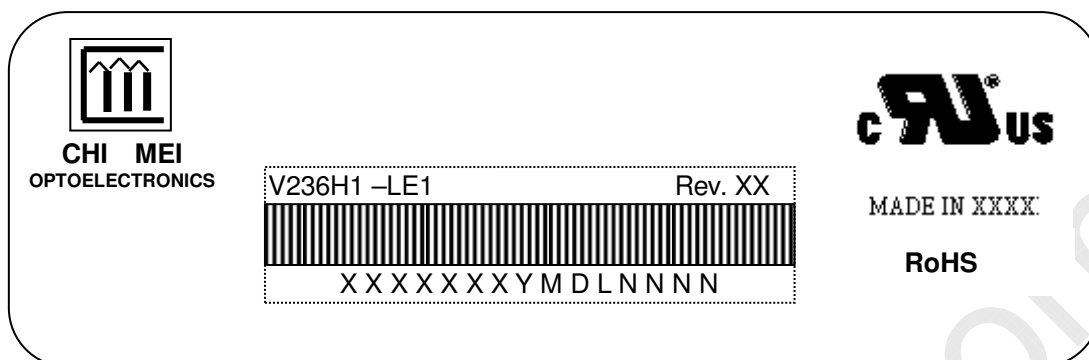
UL60950-1 or updated standard.

IEC60950-1 or updated standard.

9. DEFINITION OF LABELS

9.1 CMI MODULE LABEL

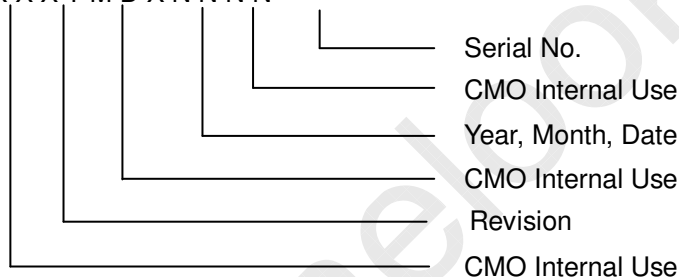
The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



Model Name: V236H1-LE1

Revision: Rev. XX, for example: A1, ..., C1, C2 ...etc.

Serial ID: X X X X X X Y M D X N N N N



Serial ID includes the information as below:

Manufactured Date:

Year : 2001=1, 2002=2, 2003=3, 2004=4...2010=0, 2011=1, 2012=2...

Month: 1~9, A~C, for Jan. ~ Dec.

Day: 1~9, A~Y, for 1st to 31st, exclude I ,O, and U.

Revision Code : Cover all the change

Serial No. : Manufacturing sequence of product

Product Line : 1 → Line1, 2 → Line 2, ...etc.

10. PACKAGING

10.1 PACKING SPECIFICATIONS

- (1) 11 LCD MODULES / 1 BOX
- (2) BOX DIMENSIONS: 620(L) X 348(W) X 430(H) MM
- (3) WEIGHT: APPROXIMATELY: 30KG (11 MODULES PER BOX)

10.2 PACKING METHOD

- (1) Carton Packing should have no failure in the following reliability test items.

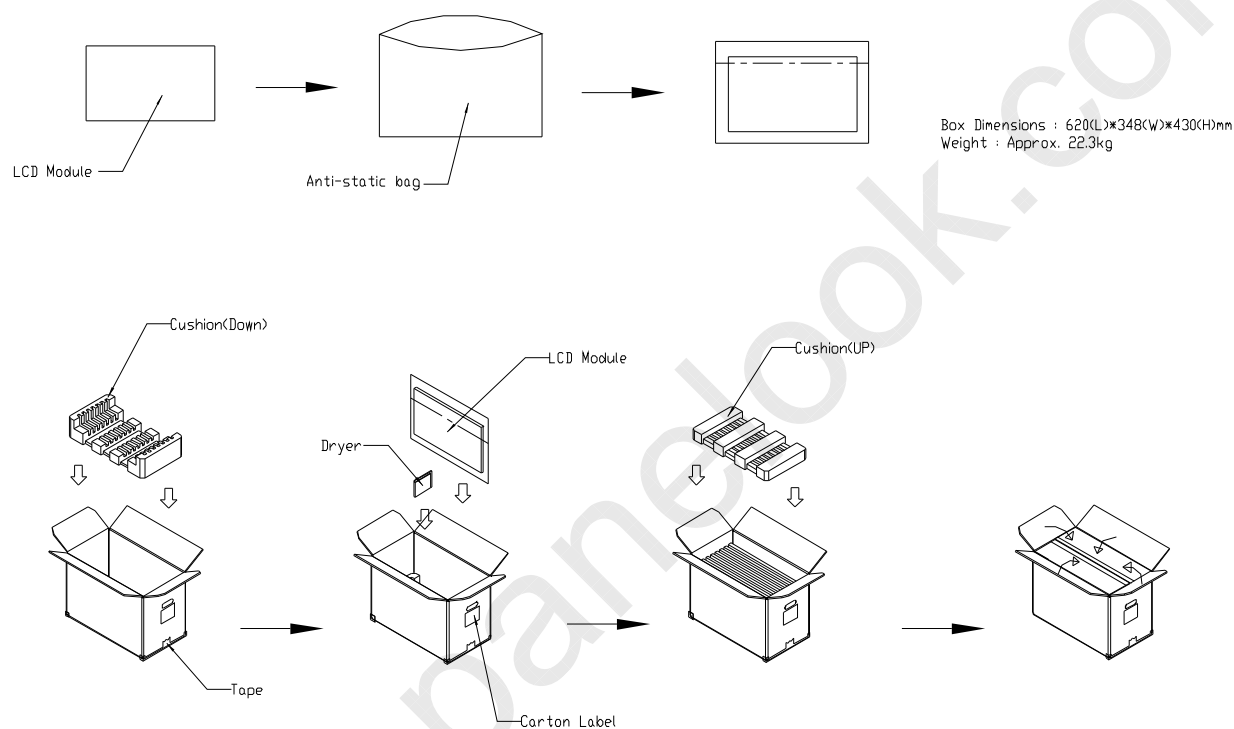
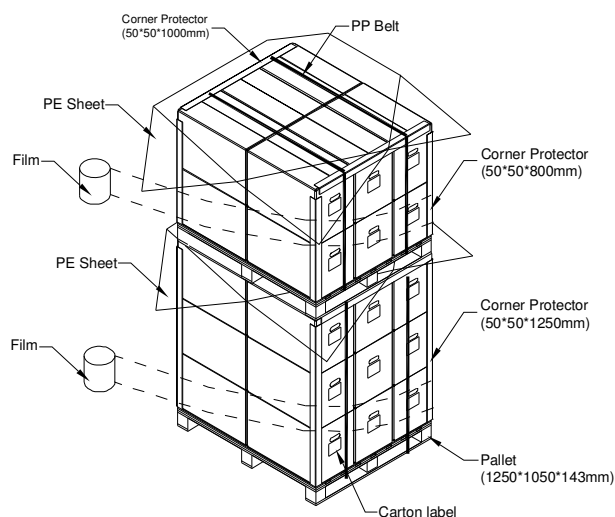


Figure 10-1 packing method

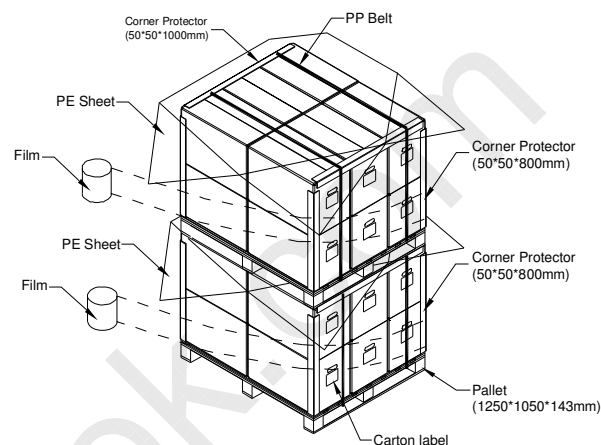


For ocean shipping

Sea / Land Transportation (40ft HQ Container)



Sea / Land Transportation (40ft Container)



For air transport

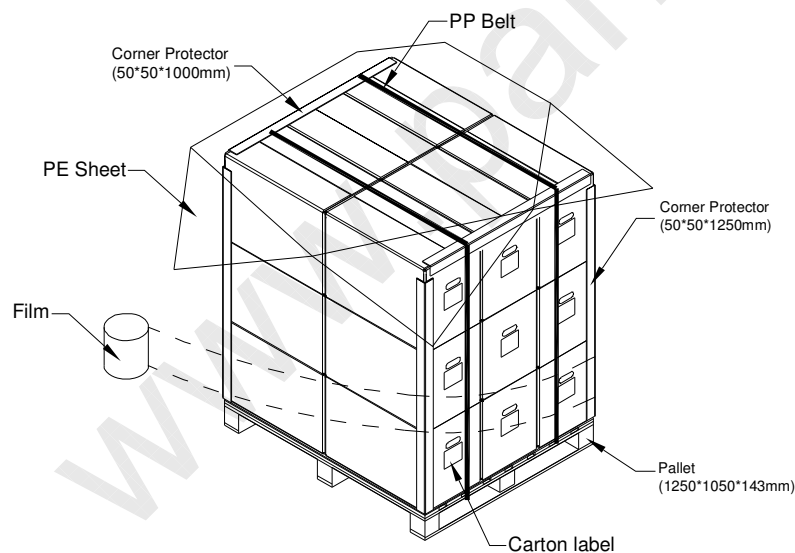


Figure 10-2 packing method

11. MECHANICAL CHARACTERISTICS

